

WHAT IS CLAIMED IS:

1. A method of identifying compounds that modulate mammalian histamine H4 receptor protein activity, comprising:
 - a) combining a putative modulator compound of mammalian histamine H4 receptor protein activity with mammalian histamine H4 receptor protein and a known histamine receptor H4 ligand; and
 - b) measuring an effect of the modulator on the protein function or its ability to bind the ligand, wherein said effect is inhibition, activation, antagonist, agonist or reverse agonist activity,wherein said modulator compound is a modulator of inflammation or inflammatory responses.
2. The method of Claim 1, wherein the effect measured in step (b) is competition between the modulator of step (a) with a known ligand of the histamine H4 receptor for binding to the receptor.
3. The method of Claim 1, wherein the effect measured in step (b) is modulation of a histamine H4 receptor intracellular second messenger.
4. The method of Claim 3, wherein the intracellular second messenger is selected from a group consisting of cAMP, calcium, and a reporter gene product.
5. A compound identified using the method of Claim 1, wherein said compound is an inhibitor of a mammalian histamine H4 receptor function and an inhibitor of inflammation or inflammatory responses *in vivo* or *in vitro*.

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6. A compound identified using the method of Claim 1, wherein said compound is an agonist, antagonist, or inverse agonist of a mammalian histamine H4 receptor and wherein said compound modulates inflammation or inflammatory responses *in vitro* or *in vivo*.
7. A compound identified using the method of Claim 1, wherein said compound modulates the expression of the mammalian histamine H4 receptor protein and wherein said compound modulates inflammation or inflammatory responses *in vitro* or *in vivo*.
8. A pharmaceutical composition comprising a compound active in the method of Claim 1 and a pharmaceutically acceptable carrier wherein said compound is a modulator of inflammation or inflammatory responses.
9. A method of treating a patient in need of such treatment to modulate inflammation or a disease or condition that is mediated by inflammation and histamine H4 receptor comprising administration of a pharmaceutical composition of Claim 8.
10. A monospecific antibody immunologically reactive with a mammalian histamine H4 receptor protein, wherein said antibody modulates inflammation or inflammatory responses *in vitro* or *in vivo*.
11. The antibody of Claim 10, wherein the antibody blocks histamine binding or activation of the mammalian histamine H4 receptor protein, wherein said antibody modulates inflammation or inflammatory responses *in vitro* or *in vivo*.
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12. A method of identifying compounds that modulate mammalian histamine H4 receptor protein activity, comprising:
- a) combining a putative modulator compound of mammalian histamine H4 receptor protein activity with mammalian histamine H4 receptor protein and a known histamine receptor H4 ligand; and
 - b) measuring an effect of the modulator on the protein function or its ability to bind the ligand, wherein said effect is inhibition, activation, antagonist, agonist or reverse agonist activity,
- wherein said modulator compound is a modulator of polymorphonuclear leukocyte activation.
13. The method of Claim 12, wherein the effect measured in step (b) is competition between the modulator of step (a) with a known ligand of the histamine H4 receptor for binding to the receptor.
14. The method of Claim 12, wherein the effect measured in step (b) is modulation of a histamine H4 receptor intracellular second messenger.
15. The method of Claim 14, wherein the intracellular second messenger is selected from a group consisting of cAMP, calcium, and a reporter gene product.
16. A compound identified using the method of Claim 12, wherein said compound is an inhibitor of a mammalian histamine H4 receptor function and an inhibitor of polymorphonuclear leukocyte activation *in vivo* or *in vitro*.
17. A compound identified using the method of Claim 12, wherein said compound is an agonist, antagonist, or inverse agonist of a mammalian histamine H4 receptor

and wherein said compound modulates polymorphonuclear leukocyte activation *in vitro* or *in vivo*.

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18. A compound identified using the method of Claim 12, wherein said compound modulates the expression of the mammalian histamine H4 receptor protein and wherein said compound modulates polymorphonuclear leukocyte activation *in vitro* or *in vivo*.
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19. A pharmaceutical composition comprising a compound active in the method of Claim 12 and a pharmaceutically acceptable carrier wherein said compound is a modulator of polymorphonuclear leukocyte activation.
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20. A method of treating a patient in need of such treatment to modulate inflammation or a disease or condition that is mediated by polymorphonuclear leukocyte activation and histamine H4 receptor comprising administration of a pharmaceutical composition of Claim 19.
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21. A monospecific antibody immunologically reactive with a mammalian histamine H4 receptor protein, wherein said antibody modulates polymorphonuclear leukocyte activation *in vitro* or *in vivo*.
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22. The antibody of Claim 21, wherein the antibody blocks histamine binding or activation of the mammalian histamine H4 receptor protein, wherein said antibody modulates polymorphonuclear leukocyte activation *in vitro* or *in vivo*.
23. A method of identifying compounds that modulate mammalian histamine H4 receptor protein activity, comprising:

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- a) combining a putative modulator compound of mammalian histamine H4 receptor protein activity with mammalian histamine H4 receptor protein and a known histamine receptor H4 ligand; and
 - b) measuring an effect of the modulator on the protein function or its ability to bind the ligand, wherein said effect is inhibition, activation, antagonist, agonist or reverse agonist activity,
- wherein said modulator compound has is a modulator of mast cell activation.

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24. The method of Claim 23, wherein the effect measured in step (b) is competition between the modulator of step (a) with a known ligand of the histamine H4 receptor for binding to the receptor.
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25. The method of Claim 23, wherein the effect measured in step (b) is modulation of a histamine H4 receptor intracellular second messenger.
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26. The method of Claim 25, wherein the intracellular second messenger is selected from a group consisting of cAMP, calcium, and a reporter gene product.
27. A compound identified using the method of Claim 23, wherein said compound is an inhibitor of a mammalian histamine H4 receptor function and an inhibitor of mast cell activation *in vivo* or *in vitro*.
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28. A compound identified using the method of Claim 23, wherein said compound is an agonist, antagonist, or inverse agonist of a mammalian histamine H4 receptor and wherein said compound modulates mast cell activation *in vitro* or *in vivo*.

29. A compound identified using the method of Claim 23, wherein said compound modulates the expression of the mammalian histamine H4 receptor protein and wherein said compound modulates mast cell activation *in vitro* or *in vivo*.
- 5 30. A pharmaceutical composition comprising a compound active in the method of Claim 23, and a pharmaceutically acceptable carrier wherein said compound is a modulator of mast cell activation.
- 10 31. A method of treating a patient in need of such treatment to modulate inflammation or a disease or condition that is mediated by mast cell activation and histamine H4 receptor comprising administration of a pharmaceutical composition of Claim 30:
- 15 32. A monospecific antibody immunologically reactive with a mammalian histamine H4 receptor protein, wherein said antibody modulates mast cell activation *in vitro* or *in vivo*.
- 20 33. The antibody of Claim 32, wherein the antibody blocks histamine binding or activation of the mammalian histamine H4 receptor protein, wherein said antibody modulates mast cell activation *in vitro* or *in vivo*.